

(Breakthrough, March 1985)

HEMI-SYNC® SYNTHESIZER IN SCHOOLS

Pilot tests of the Hemi-Sync Synthesizer are nearing completion in several schools in the Tacoma, WA area. Because of the positive results so far, it has been introduced in to several other schools throughout the United States. The synthesizer was born out of prior research using music and Hemi-Sync with students under the supervision of Devon Edrington in Tacoma, WA. Since 1978, when the research was started, several thousand students from elementary grades through graduate school have utilized Hemi-Sync for cognitive and affective learning enhancement .

The Hemi-Sync Synthesizer is an electronic device that provides an audio environment which enables the listener to focus upon his chosen task. The synthesizer produces Hemi-Sync signals and automatically mixes them with music or other material from an external tape recorder. This composite sound consisting of the Hemi-Sync sound patterns and the music is then amplified and played over external speakers or stereo headphones. Speakers provide a Hemi-Sync background for regular classroom activities while stereo headphones can be used to make full use of the brain's involvement in mixing frequencies.

The Hemi-Sync signal produced in the synthesizer will track 20 decibels below the amplitude of the music or voice tape that is being used. The Hemi -Sync therefore remains inaudible to normal listening and that is the level at which it is most effective.

ACHIEVING OPTIMAL LEARNING STATES

Several persistent themes dominate the history of consciousness enquiry, one of which is that humans use only a small portion of their mental capacity. Estimates vary, but there is agreement that most of us use less than 10 percent, and some researchers say that figure is more on the order of one-tenth of one percent. The obvious question arising from this observation is "How can we tap some, or all, of that wasted potential?" The question has not gone unanswered, and in the past fifty years the answers have varied widely. But a careful examination of the answers given in the last ten or fifteen years reveals a common thread. The thread is the conviction that optimal learning takes place when the learner is in a certain state of consciousness. The state is not one of intense arousal, as when one is anxious, excited, hyperactive or fearful. Nor is it sleep as some people thought twenty years ago. The optimal learning state is what brain researchers call the "theta state", which corresponds to brainwaves emitted by the left and right hemispheres of the brain. By using an electroencephalograph, we find that the brain emits electrical impulses within a frequency range of approximately 0.5 Hertz Co 26 Hertz. For the sake of convenience, this range has been parceled into four sub-ranges:

BRAIN STATE	CONSCIOUSNESS CORRELATES
Beta-13-26 Hz.	Alert, sometimes focused. Problem Solving-analytic
Alpha-8-13 Hz	Alert but unfocused
Theta-4-8 Hz	Very relaxed, optimal learning state
Delta-0.5-4 Hz	Deep sleep, unconscious

Rough correlates for these frequency-ranges have been established by observation. Numerous hypotheses have been advanced to explain the apparent inconsistency between the claim that theta is the optimal learning state and beta the optimal problem solving state. One of the more appealing hypotheses is that beta involves our critical, judgemental faculty, whereas theta is a highly receptive, uncritical state. Educators have long noted the detrimental effect of a judgemental posture on learning.

If theta is the best learning state, how do we achieve it? It happens that theta is the “slipperiest” of the four EEC ranges. The only time most of us are in theta is during the hypnogogic state—on the way into sleep, and during the hypnopompic state—the way out of sleep. Both of these states are normally of short duration, a few minutes or less. Only highly experienced meditators can achieve and hold the theta state for an extended period of time. Unless we are willing to discipline ourselves through the years of meditation practice, extended periods of the theta state might seem unattainable.

Listening to only a theta signal often results in sliding right down into delta-sleep. To prevent this, a beta signal is superimposed on the theta, which brings about relaxed alertness. But this relaxed alertness is of a special kind, for Hemi-Sync—as the name implies—synchronizes the brain’s hemispheres. There has been so much discussion about hemispheric symmetry in the past decade that we’re sure you are aware of the importance of having both hemispheres of the brain function as an unit. There is near universal agreement that a balanced personality is desirable—one in which the rational and intuitive aspects work in harmony. Hemi-Sync helps accomplish this and the effect it has upon students is dramatic.

THE BENEFITS OF HEMI-SYNC

- It is effective, it works.
- It is easy to use, for it requires little time or effort of the teacher.
- No special facilities and a minimum of equipment are needed.

- It is Inexpensive.
- Both teacher and student are in the Hemi-Sync environment, so both are more relaxed and alert.
- It creates a feeling of calmness, trust, cooperation and self confidence in teacher and student by virtue of their mutual involvement.
- It gives the teacher effective control over the mood of the classroom.
- Student's "on task time" is greatly increased.
- It requires very little teacher training.
- It leaves the listener feeling more harmonious and whole.
- It focuses attention without bribes or threats.
- It aids visualization and other imaging.
- It enhances cognitive and affective learning.

USE OF THE SYNTHESIZER

The Hemi-Sync Synthesizer is a simple instrument to operate. It has a number of different settings from which the operator may choose for enabling the types of attention most appropriate for classroom situations. Some suggestions for the effective use of the Hemi-Sync Synthesizer, Model 202 are:

TEST: For testing automatic Hemi -Sync level control.

OFF: For listening to music without Hemi-Sync.

This setting allows the operator to do a controlled study in a classroom or on an individual basis to test the effects of Hemi-Sync,

R: RELAXATION (Theta mixed with Delta)

It is a well known fact that sustained concentration upon a task is difficult when a person is in an excited state. Students who have come from the play ground or from any activity involving considerable sensory stimulation have difficulty "settling down" to an intellectual task. Use of the "R" position for a few minutes greatly accelerates the calming process. The teacher should be alert for signs of drowsiness when "R" is in use, since prolonged exposure often results in sleepiness. Ordinarily, three to five minutes on "R" is adequate to produce a calm, relaxed class.

I: IMAGING, AFFECTIVE LEARNING (Theta)

The use of guided imagery is rapidly gaining acceptance in education. The "I" setting greatly enhances imaging ability. Whether the teacher makes conscious use of imaging

techniques or not, there is no doubt about the importance of imaging (particularly visual and auditory) for learning. Thus the “I” setting is indicated during any period that students are listening to a story, watching a film, drawing, composing, dealing with spatial relationships, or engaging in any “right brain” activity. Extended use (thirty minutes to an hour) may result in drowsiness, thus the teacher should be watchful. If students become drowsy, switching to “IA” will permit continuation of the activity in progress .

A: ATTENTION FOCUSING, COGNITIVE LEARNING (Theta mixed with Delta and Beta)

Optimal cognitive learning is achieved with a relaxed body and an alert mind. The “A” setting assists learners in reaching and maintaining this state. This is the most frequently used setting since most classroom learning (particularly in secondary and post-secondary education) is cognitive.

IA: IMAGING AND ATTENTION (Theta mixed with Beta)

As indicated above (under “I”), this setting is useful for arousing ^ students who have become drowsy during a long imaging session. The “IA” setting is also appropriate for those areas of cognitive learning for which visual and auditory imagery are central, as in geometry, music theory, and foreign languages.

Every learning situation is unique, as is every learner. Thus, the operator must be sensitive to the situation and select Hemi-Sync Synthesizer settings accordingly. The suggestions given above are intended to be used only as a starting point. With experience, the teacher will develop patterns appropriate to his/her teaching style, the type of student, and the situation. Use only the recommended music since most music interferes with the Hemi-Sync patterns. (See list of music in *The Palliative For Wandering Attention* written by Devon Edrington.)

The Monroe Institute was the sole source of the Hemi-Sync Synthesizers. It is no longer available.

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